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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,324

05/16/2007

Masahiro Takada

2006\_1448A

7699

52349 7590 04/15/2011  
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EXAMINER

ECHELMeyer, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1729

NOTIFICATION DATE

DELIVERY MODE

04/15/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ddalecki@wenderoth.com  
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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/593,324	TAKADA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Alix Elizabeth Echelmeyer	1729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to the amendment filed February 24, 2011. Claims 1 and 3-7 are amended. Claim 2 is cancelled. Claims 1 and 3-7 are pending and are rejected finally for the reasons given below.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4, and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Imamura et al. (US 2004/0033399).

Imamura et al. teach a fuel cell system comprising a fuel cell stack of individual fuel cells connected in series (abstract). Fuel and air supply devices are included in the system ([0016]).

Imamura et al. teach a controller for determining and controlling the air and fuel supply to the fuel cell stack (Figure 1, [0044], [0045]).

The controller of Imamura et al. controls the hydrogen supplied to the individual cells so that the voltage variation, or standard deviation from the average voltage for the stack, is minimized ([0012], [0013], [0060]).

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The system of Imamura et al. controls the fuel supply based on signals from the load and the fuel cells ([0045]). The skilled artisan will find that it is inherent in the system of Imamura et al. that, for conditions when the load is constant, the total input of fuel and air must be constant in order to prevent changes in the power output of the fuel cell system.

As for claims 4 and 5, since the controller of Imamura et al. calculates voltage deviation and the average value of voltages and controls the fuel supply based on those calculations, the controller of Imamura et al. is inherently capable of the limitations. For example, the controller of Imamura et al. determines whether the voltage deviation within a certain range, testing over intervals of time (Figure 6, [0072]).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imamura et al. as applied to claim 1 above, and further in view of Enjoji et al. (US 2004/0185315).

The teachings of Imamura et al. as discussed above are incorporated herein.

Imamura et al. teach a controller which receives inputs regarding the load and inputs from temperature measuring devices ([0095]). Imamura et al. fail to teach a table based on those inputs for determining the desired fuel supply amounts.

Enjoji et al. teach a controller which uses control values to control the air and hydrogen flow to a fuel cell stack ([0028], [0029]).

The controller of Enjoji et al. further comprises a data table with information of every possible load value and their relationships to temperature and other factors. The table is used to determine the control values discussed above ([0053]).

It would have been obvious to the skilled artisan at the time the invention was made to include a data table such as the table of Enjoji et al. in the controller of Imamura et al. in order to better control the reactant supply to the fuel cell stack, since better control of reactant supply increases efficiency, decreases waste, and protects the fuel cells from misuse by ensuring that they are operated properly.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imamura et al. as applied to claim 1 above, and further in view of Koizu et al. (US 2005/0014043).

The teachings of Imamura et al. as discussed above are incorporated herein.

Imamura et al. teach a fuel cell system for providing power to a load but fail to teach a power converter for controlling the voltage or current of the fuel cell stack.

Kozu et al. teach a power converter for converting the power output from a fuel cell stack for use in supplying the power to a load (abstract).

Kozu et al. further teach that the power converter controls the output of the fuel cell stack based on the target value determined by the load. The power converter controls the output within a desired range of current and voltage, and also communicates the target power to the controller for control of the voltage and current (Figure 4, [0129]).

As for claim 7, the controller inherently controls the amount of reactant supplied to each cell based on the desired power because the controller seeks to minimize standard deviation.

It would have been obvious to the skilled artisan at the time the invention was made to use a power converter such as the power converter of Kozu et al. in the system of Imamura et al. in order to provide better control of the power output of the fuel cell stack, since that would increase efficiency by not creating too much or too little power for the load.

***Response to Arguments***

7. Applicant's arguments filed February 24, 2011 have been fully considered but they are not persuasive.

Applicant argues, see specifically page 7 of the Remarks, that Imamura et al. do not teach increasing or decreasing the air or fuel supply to one cell while keeping the overall supply the same.

As is discussed above, the examiner finds that, in instances when the load demand on the fuel cell system is constant, the overall reactant supply would necessarily have to be constant despite any changes in supply to individual cells. The skilled artisan will recognize that, in a constant load situation, it is necessary to keep the overall reactant supply constant so that the needed amount of power is produced. If the overall reactant supply is decreased, then not enough power will be provided to the load. If the overall reactant supply is increased, then too much power will be produced and the system will be operating inefficiently.

While Imamura et al. do not explicitly teach a constant load situation, the skilled artisan will find that the controller of Imamura is inherently configured to control the supply of reactants based on load demands (Figure 1, [0049]).

Furthermore, the examiner finds that one having ordinary skill in the art would easily conceive of situations wherein the load demands on a fuel cell system are constant. For example, Brenner et al. (US 2005/0014042) provide such a teaching ([0009]).

So, the person having ordinary skill in the art, knowing that the controller of Imamura et al. is configured to provide reactants based on the load demand

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and being capable of recognizing that sometimes a fuel cell will operate under constant load demands, will recognize that the controller of Imamura et al. would inherently keep the reactant supply constant when the load demand is constant.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ula Ruddock can be reached on 571-272-1481. The fax



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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ula C Ruddock/  
Supervisory Patent Examiner  
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